

### LISTING OF CLAIMS

1. *(currently amended)*: A nucleic acid molecule encoding a fusion polypeptide useful as a vaccine composition, which molecule comprises:
- (a) a first nucleic acid sequence encoding a first polypeptide or peptide that promotes processing via the MHC class I pathway,[[:]]  
wherein the first polypeptide or peptide is by SEQ ID NO:9 or by nucleotides 10633-12510 of the *Mycobacterium tuberculosis* genome set forth in GENBANK Z95324 AL123456; or
    - (ii) SEQ ID NO:10; or
    - (iii) an active C-terminal domain of (i) or (ii);
  - (b) fused in frame with the first nucleic acid sequence, a second nucleic acid sequence encoding a signal peptide; and
  - (c) a third nucleic acid sequence that is linked in frame to said first nucleic acid sequence and that encodes an antigenic polypeptide or peptide which comprises an epitope that binds to a MHC class I protein which epitope is present on, or is cross-reactive with, an epitope of a pathogenic organism, cell, or virus.

### **CANCEL Claims 2-6.**

- 7. The nucleic acid molecule of claim 6, wherein the virus is a human papilloma virus.
- 8. The nucleic acid molecule of claim 7, wherein the antigen is an E7 polypeptide of HPV-16 having the sequence SEQ ID NO:2, or an antigenic fragment thereof.
- 9. The nucleic acid molecule of claim 8, wherein the HPV-16 E7 polypeptide is a non-oncogenic mutant or variant of said E7 polypeptide.
- 10. The non oncogenic mutant of claim 9 wherein the sequence of the E7 polypeptide differs from SEQ ID NO:2 by one or more of the following substitutions:
  - (a) Cys at position 24 to Gly or Ala
  - (b) Glu at position 26 to Gly or Ala
  - (c) Cys at position 91 to Gly or Ala.

11. The nucleic acid molecule of claim 7, wherein the antigen is the E6 polypeptide of HPV-16 having the sequence SEQ ID NO:4 or an antigenic fragment thereof.

12. The nucleic acid molecule of claim 11, wherein the HPV-16 E6 polypeptide is a non-oncogenic mutant or variant of said E6 polypeptide.

13. The non oncogenic mutant of claim 12 wherein the sequence of the E6 polypeptide differs from SEQ ID NO:4 by one or more of the following substitutions:

- (a) Cys at position 70 to Gly or Ala
- (b) Cys at position 113 to Gly or Ala.
- (c) Ile at position 135 to Thr

14. The nucleic acid molecule of claim 1 that is characterized as pNGVL4a-Sig/E7(detox)/HSP70, and has the sequence SEQ ID NO:13.

### **CANCEL Claim 15**

16. *(currently amended):* An expression vector comprising the nucleic acid molecule of ~~any of claims 1-13~~ claim 1 operatively linked to

- (a) a promoter; and
- (b) optionally, additional regulatory sequences that regulate expression of said nucleic acid in a eukaryotic cell.

17. An expression vector comprising the nucleic acid molecule of claim 14. operatively linked to

- (a) a promoter; and
- (b) optionally, additional regulatory sequences that regulate expression of said nucleic acid in a eukaryotic cell.

18. *(currently amended):* The expression vector of claim 16 which comprises ~~is a~~ plasmid PNGVL4a.

19. *(currently amended):* The expression vector of claim 17 ~~[[18]]~~ which comprises ~~wherein said plasmid~~ [[is]] pNGVL4a.

20. *(currently amended)*: A pharmaceutical composition capable of inducing or enhancing an antigen-specific immune response, comprising:

- (a) pharmaceutically and immunologically acceptable excipient in combination with;
- (b) ~~a composition comprising the nucleic acid molecule of any of claims 1-13~~ claim 1.

21. A pharmaceutical composition capable of inducing or enhancing an antigen-specific immune response, comprising:

- (a) pharmaceutically and immunologically acceptable excipient in combination with;
- (b) the nucleic acid molecule of claim 14.

22. A pharmaceutical composition capable of inducing or enhancing an antigen-specific immune response, comprising:

- (a) pharmaceutically and immunologically acceptable excipient in combination with;
- (b) the expression vector of claim 16.

23. A pharmaceutical composition capable of inducing or enhancing an antigen-specific immune response, comprising:

- (a) pharmaceutically and immunologically acceptable excipient in combination with;
- (b) the expression vector of claim 19.

24. *(currently amended)*: A method of inducing or enhancing an antigen specific immune response in a subject comprising administering to the subject an effective amount of the pharmaceutical composition of claim 22 [[20]], thereby inducing or enhancing said response.

25. *(currently amended)*: A method of inducing or enhancing an antigen specific immune response in a subject comprising administering to the subject an effective amount of the pharmaceutical composition of claim 44 [[21]], thereby inducing or enhancing said response.

26. *(currently amended)*: A method of inducing or enhancing an antigen specific immune response in a subject comprising administering to the subject an effective amount of the pharmaceutical composition of claim 45 [[22]], thereby inducing or enhancing said response.

27. A method of inducing or enhancing an antigen specific immune response in a subject comprising administering to the subject an effective amount of the pharmaceutical composition of claim 23, thereby inducing or enhancing said response.

**CANCEL Claim 28.**

29. The method of claim 24 wherein said subject is a human.

30. The method of claim 25 wherein said subject is a human.

31. The method of claim 26 wherein said subject is a human.

32. The method of claim 27 wherein said subject is a human.

33. The method of claim 29 wherein said administering is by a intramuscular injection by gene gun administration or by needle-free jet injection.

34. The method of claim 30 wherein said administering is by a intramuscular injection by gene gun administration or by needle-free jet injection.

35. The method of claim 31 wherein said administering is by a intramuscular injection by gene gun administration or by needle-free jet injection.

36. The method of claim 32 wherein said administering is by a intramuscular injection by gene gun administration or by needle-free jet injection.

37. *(currently amended)*: A method of inhibiting growth or preventing re-growth of a tumor expressing HPV E7 ~~or E6~~ protein in a subject, comprising administering to said subject an effective amount of a pharmaceutical composition of claim 44 [[20]], wherein said third nucleic acid sequence encodes one or more epitopes of E7 ~~or E6~~, thereby inhibiting said growth or preventing said re-growth.

38. *(currently amended)*: A method of inhibiting growth or preventing re-growth of a tumor expressing HPV E7 ~~or E6~~ protein in a subject, comprising administering to said subject an effective amount of a pharmaceutical composition of claim 45 [[21]], wherein said third nucleic acid

sequence encodes one or more epitopes of ~~E7 or E6~~, thereby inhibiting said growth or preventing said re-growth.

### **CANCEL Claim 39**

40. *(currently amended)*: A method of inhibiting growth or preventing re-growth of a tumor expressing HPV E7 ~~or E6~~-protein in a subject, comprising administering to said subject an effective amount of a pharmaceutical composition of claim 23, wherein said third nucleic acid sequence encodes one or more epitopes of E7 ~~or E6~~, thereby inhibiting said growth or preventing said re-growth.

41. *(new)*: An expression vector comprising the nucleic acid molecule of claim 13 operatively linked to

- (a) a promoter; and
- (b) optionally, additional regulatory sequences that regulate expression of said nucleic acid in a eukaryotic cell.

42. *(new)*: The expression vector of claim 41 which comprises plasmid pNGVL4a.

43. *(new)*: A pharmaceutical composition capable of inducing or enhancing an antigen-specific immune response, comprising:

- (a) pharmaceutically and immunologically acceptable excipient in combination with;
- (b) the nucleic acid molecule of claim 13.

44. *(new)*: A pharmaceutical composition capable of inducing or enhancing an antigen-specific immune response, comprising:

- (a) pharmaceutically and immunologically acceptable excipient in combination with;
- (b) the expression vector of claim 17.

45. *(new)*: A pharmaceutical composition capable of inducing or enhancing an antigen-specific immune response, comprising:

- (a) pharmaceutically and immunologically acceptable excipient in combination with;
- (b) the expression vector of claim 41.